DRAFT SUPPLEMENT TO THE DRAFT FISH AND WILDLIFE COORDINATION ACT REPORT FOR THE AMERICAN RIVER WATERSHED INVESTIGATION LONG-TERM EVALUATION

for the

BUSHY LAKE WETLAND FILTRATION PLAN (ALTERNATIVE 4) OF THE ECOSYSTEM RESTORATION ALTERNATIVES

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FISH AND WILDLIFE IMPACTS ANALYSIS AND HEP EVALUATION FOR THE BUSHY LAKE WETLAND FILTRATION PLAN (ALTERNATIVE 4)

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INTRODUCTION AND BACKGROUND

Site Location and General Description. The Bushy Lake site is a 343 acre publically-owned (Sacramento County–Lower American River Parkway and the State–Cal Expo) tract located just inside the Lower American River (LAR) levee, immediately south of the Cal Expo (California State Fair) grounds and facilities. The site is across the river from Paradise Beach, a popular recreational swimming beach along the river. The site is bordered on the south by the LAR-specifically River Miles 4.0 to 5.5. The name of the site is derived from its central feature-Bushy Lake, which is a shallow, mostly open water lake comprising about 12 acres on the north-central portion of the site. Further description of the site, including its existing fish and wildlife resources and values, is provided in the Fish and Wildlife Service's (Service's) draft Fish and Wildlife Coordination Act (FWCA) report (USFWS 2001a).

Alternatives Evaluated to Date. Just as for the other four ecosystem restoration options being considered by the Corps (U.S. Army Corps of Engineers) under its long-term evaluation of the LAR and American River Watershed, JSA (Jones and Stokes Associates) of Sacramento initially developed two concept design restoration alternatives for the Bushy Lake site. These alternatives, which focused primarily on creation of additional oak woodland, riparian forest, seasonal wetland, shallow aquatic, and grassland areas at the site, were first evaluated in the Service's preliminary draft FWCA report (USFWS 2001b) provided to the Corps in April 2001.

Subsequently, in July 2001, JSA developed a third conceptual alternative for the Bushy Lake site designed to ameliorate two significant environmental issues related to the site: relatively low water quality within Bushy Lake and contaminated (mainly metals and pesticides) stream inflow across the easterly portion of the site into the LAR from Chicken and Strong Ranch sloughs (CSRS). This third alternative (the "filtration swale" plan) and the two earlier alternatives were evaluated qualitatively and using HEP (Habitat Evaluation Procedures) in the Service's draft FWCA report (USFWS 2001a) provided to the Corps in August 2001.

Need for a Fourth Alternative. Both the Service's HEP evaluations and qualitative analyses of the three alternatives failed to indicate a clearly preferable alternative from strictly a habitat-value (HEP) perspective. In particular, the estimated AAAHUs (Adjusted Average Annual Habitat Units; *see* USFWS 2001a)/acre that would be gained ranged from only 0.27 to 0.29 for the three alternatives, and these values were lower than some of the projected habitat-value gains estimated for certain other restoration alternatives and sites. In addition, the Service and JSA determined that Alternative 3 was in need of both (1) some design changes to better meet its

objectives; and (2) more extensive analysis of the CSRS contaminants issues and the Bushy Lake water quality issues. As a result, SAFCA (Sacramento Area Flood Control Agency), the Corps' local sponsor for the proposed projects, commissioned JSA to study these issues in greater detail and to develop an improved "wetland filtration" Alternative 4. JSA's work culminated recently in a report (JSA 2001) which provides Alternative 4 evaluated here. JSA also provided the Service with a map of Alternative 4 which was similar in scale and scope to the maps provided of the various other restoration alternatives.

ALTERNATIVE 4 FEATURES [1]

Wetland Filtration–Comparison to Alternative 3[2]. In Alternative 3, water quality improvements were addressed using a circuitous system (8.3 acres) of "natural channels" to convey CSRS inflow to Bushy Lake and eventually to an outlet into the LAR along the south-central border of the Bushy Lake site. Under Alternative 4, a more classic wetland filtration system using both a wet marsh and seasonal wetlands is proposed.

Wetland Filtration–Specific Features. A portion of the flow from CSRS would be pumped from a point just outside the main river levee near the easterly edge of the Bushy Lake site through a 16-inch PVC pipe to a 7.5-acre treatment wetland complex constructed adjacent to the westerly edge of the Cal Expo overflow parking lot. This 7.5-acre complex would include: (1) about 1.5-acres for a low (<5 feet-high) ring levee/berm surrounding the complex; (2) a 1-acre sediment forebay about 3 feet in depth; (3) about 5 acres of emergent marsh vegetation (mainly bulrush [*Scirpus* spp.]); (4) a 0.10-acre deepwater (>3 feet) outlet zone; and (5) two weirs–one for regulating inflow into the emergent marsh area from the sediment forebay and one for regulation of outflow from the deep outlet area.

Along the southerly edge of Bushy Lake, two "patches" of seasonal wetlands totaling 9.9 acres would be developed. Also, 1.7 acres of natural channel, of the type proposed under Alternative 3, would be built extending from one of these seasonal wetlands to an outlet into the LAR near the Capital City Freeway. In addition, a 3-8 acre seasonal wetland would be constructed along the river side-channel area on the southwesterly edged of the site; however, this would not be a direct element of the wetland filtration system.

Wetland Filtration–Operation. Average flows in CSRS at the proposed pumping location are estimated to average about 1-4 cfs (cubic ft/second) during summer up to a maximum of about 24 cfs during winter and spring. During January-April and May-December, respectively, about 3 cfs and 1 cfs would be diverted into the PVC pipeline by pumping from CSRS. The pumped water would enter the treatment wetland settling basin, flow across the weir into the treatment

[1] Discussion here pertaining to the wetlands filtration plan are based solely on the recent JSA (2001) report.

[2] All references to Alternatives 1-3 and to any alternatives for the other proposed restoration sites, are based on the description and evaluations in the Service's draft FWCA report (USFWS 2001a).

wetland, across the treatment wetland (as a sheet flow), out of the wetland into Bushy Lake, out of Bushy Lake and across a seasonal wetland, into the natural channel, and ultimately, back into the LAR near the Capitol City Freeway.

The design would provide for a water residence time within the treatment wetland of 7-10 days. Estimated average outflow into the LAR from the natural channel would be about 3 cfs during February-June and 0.5 cfs during the remainder of the year. CSRS water would be sufficient to maintain Bushy Lake at a stable level. Nevertheless, the Cal Expo well pump presently used to maintain Bushy Lake during the dry season would be spliced in to the new 16-inch PVC pipe extenting from CSRS to the wetlands. The Cal Expo well would thus be available to maintain flow to Bushy Lake if and when CSRS flow became unavailable for any reason (including due to any unforeseen contaminant-related problems which might develop related to the plan).

Other Restoration Elements (Compared to Alternative 3). Riparian forest would be reduced from 27.7 to 17.4 acres. Oak woodland savannah would decrease from 86.0 to 66.5 acres. However, both riparian forest and oak woodland savannah would be sited in the same general areas as in Alternative 3.

One new cover-type would be created: mudflats. Mudflats would occur at two sites adjacent to Bushy Lake and total about 6.1 acres. Mudflats would not be planted; they would be maintained at least during July-October annually through control of the lake's water surface elevation. Dead cottonwood snags in the two mudflats areas would be maintained as is.

The same riparian forest, seasonal wetland, and shallow aquatic area (6.7 acres total) proposed along the southeastern edge of the Bushy Lake site under Alternative 1, 2, and 3 would also be a feature of Alternative 4.

Restoration Measures. One new restoration measure would be employed: Measure 19–to improve the water quality flowing into the LAR from CSRS by diverting a portion of the CSRS flow through a treatment emergent marsh wetland and Bushy Lake before discharge into the LAR. Otherwise, the restoration measures of Alternative 4 are the same as Alternative 3, except that the measures (1, 8) applicable to riparian oak woodland creation of Alternative 4 would not be used.

DERIVATION OF AAAHUs

The projected gains of AAAHUs were assessed just as for Alternative 3, using a qualitative analysis and the HEP results from Alternatives 1 and 2 for Bushy Lakes and other alternatives and sites, as needed. Results are provided in Table 10b. Additional considerations were the existing habitat conditions where the various new habitat features would occur and the relative degree of impact expected in creating the new habitats. Rationals and key assumptions, by restoration measure, are:

Table 10b. Adjusted (by RVIs) habitat values from HEP for Bushy Lake Alternative 4 as described by JSA (2001).

COVER TYPE TO BE CREATED	ACRES	AAAHUs NET GAIN	AAAHUs GAIN/ACRE
Riparian Forest (Measure 15)	4.02	1.96	0.49
+ Seasonal Wetland	1.34	0.87	0.65
+ Shallow Aquatic	1.34	0.99	0.74
Oak Woodland Savannah (Measure 9)	66.48	17.24	0.26
Wetland Filtration (Measures 19, 25)	7.50	2.78	0.37
Riparian Forest (Measure 7)	17.39	7.30	0.42
Seasonal Wetland (Measure 13)	13.70	0.82	0.06
Natural Channel	1.73	0.61	0.35
Open Water (Lake Improvements)	18.22	9.11	0.50
Mudflats	6.10	2.44	0.40
ALTERNATIVE 4 TOTALS	137.84	44.12	0.32

1. Measure 15: Riparian forest, seasonal wetland, and shallow aquatic creation on 6.70 acres. All acerages and habitat values, including net gains and rates of gain, would be the same as for Alternatives 1, 2, and 3 (*see* Table 10b; USFWS 2001a).

2. Measure 9: Oak woodland savannah creation on 66.48 acres. The same general area would be affected as in Alternative 3. Habitat values can be prorated from Alternative 3 results (*see* Table 10a; USFWS 2001a), based on the change of acreage from 86.04 to 66.48 acres (Table 10b).

3. Measures 1 and 8: Not applicable to Alternative 4.

4. Measure 19 and 25: Treatment wetland complex on 7.5 acres. The 5.0 acres of emergent marsh is expected to have about 60% more habitat value than the EWI emergent wetland proposed under Alternative 1 at the Urrutia site, due to its greater size and perpetual management. The 1.0 acre of open water is expected to have about 50% higher habitat value than the open water proposed under Alternative 3 for Bushy Lake, due to improved water quality resulting from the flow-through conditions. The 1.5 acres of levees would develop upland/herbaceous vegetation subject to periodic maintenance clearing, but would generally have neither a gain nor a loss of overall, project-life habitat value. For the 7.5-acre complex as a whole, the consolidated habitat values are derived as weighted (by acreage) means. The

estimated gain/acre is 0.37 AAAHU's (([5.0 x 0.48] + [1.0 x 0.38]) ÷ 7.5).

5. Measure 7: Riparian forest creation on 17.39 acres. The *rate* of habitat-value gain is expected to be about 50% greater than for the riparian forest proposed in Alternative 3, because of improved siting, which would result in less impact to existing habitat values thus providing the greater gain. The prorated (based on acreage reduction compared to Alternative 3) gain/acre is thus 0.42 AAAHUs.

6. Measure 13: Three seasonal wetlands patches graded back towards the LAR. Due to improvement in hydrology which would reduce fish stranding potential, the *rate* of habitat-value gain is expected to be the same as for SW1 seasonal wetland proposed for creation under Alternative 2 at the Woodland site. This gain/acre is thus 0.06 AAAHUs (*see* Table 5; USFWS 2001a).

7. Unspecified as to Measures: Improvements to 18.22 acres of open water of Bushy Lake, through improved water level control, bathymetry, water quality, aquatic food base, habitat mixes, fish passage after high flows and other factors, would double the rate of habitat value *gain* determined for Bushy Lake open water under Alternative 3. The rate of gain is thus 0.50 AAAHUs/acre (Table 10b).

The 1.73 acres of natural channel would have the same habitat value gain as for this feature in Alternative 3. The rate of gain is 0.35 AAAHUs/acre (see Table 10a; USFWS 2001a).

Creating two parcels of mudflats within the lake area cannot be analyzed within the framework of the existing HEP procedures, since no other site had this cover-type either created or impacted. Thus, an HIS model(s) was not developed to account for this cover-type. Because the acreage involved is relatively small (6.1 acres), it is simply assumed that the habitat-value *gain* for this element is about 40% less than the gain for SAQ1 shallow aquatic proposed for creation under Alternative 1 at the Woodlake site (*see* Table 5; USFWS 2001a). The gain is thus 0.40 AAAHUs/acre.

RESULTS AND DISCUSSION

In terms of *rate* of habitat value gain, alternative 4, with a gain/acre of 0.32 AAAHUs would be incrementally better than either Alternative 1 (0.29), 2 (0.27), or 3 (0.27) at the Bushy Lake site. In addition, Alternative 4 is superior to the other alternatives in other ways which were not adequately reflected in the HEP accounting. JSA (2001) has elaborated on these benefits and the Service largely agrees with their assessment and conclusions. Among the unmeasured or only particularly measured (using HEP) fish and wildlife benefits of Alternative 4 are that:

- Bushy Lake would be enlarged and stabilized, thereby providing more wetland habitat for a greater length of time each year;

- New habitats and a better mix of habitats would provide for greater fish and wildlife diversity and carrying capacity for the Bushy Lake site as a whole;

- The potential for fish stranding, including stranding of listed species, would be reduced throughout the site;

- Deeper and more stable water levels of the lake would equate with improved diversity and abundance of aquatic life forms which in turn should benefit higher fish and wildlife organisms;

- An incremental reduction may be achieved in contaminants from CSRS flowing into the LAR and hence into the Sacramento River and Sacramento-San Joaquin Delta;

Nevertheless, a relatively high degree of uncertainty exists regarding the ability of the proposed wetland filtration alternative (4) to meet objectives related to reducing contaminant input into the LAR while not creating, over the long term, any additional contaminant-related problems for fish and wildlife (*see* USFWS 2001). JSA (2001) correctly points out that there are no functioning filtration wetlands of this type locally to draw knowledge from and that current data are generally insufficient to determine either effectiveness or to accurately predict total annual operation and maintenance costs of the Bushy Lake proposal over the long term. For these reasons, it is imperative that, at a minimum, all of the operations and maintenance actions identified in the JSA (2001) report be committed to and binding if and when this alternative may actually be proposed for implementation.

CONCLUSIONS RELATIVE TO ALTERNATIVE 4

Despite similar HEP values among the four alternatives at the Bushy Lake site, Alternative 4 appears to have the highest potential for fish and wildlife habitat-value improvements. The Service would likely endorse implementation of Alternative 4, or closely related alternatives, provided that: (a) impacts to elderberries and VELB would be fully avoided, minimized and offset using Service conservation guidelines for the VELB; (b) all wetland filtration aspects of the project were implemented incrementally in stages which could, if necessary, be halted; and (c) each constructed stage would be monitored and evaluated fully as described in the JSA(2001) report to help ensure than a serious new contaminant-related problem for fish and wildlife does not develop as a result of the proposed plan.

Losses of SRA cover along 2,500 LF of bank such as would occur under current measures 13 and 15 in Alternative 3 and the three other alternatives at the site would likely be acceptable to the Service, provided that the associated losses of elderberries could be fully avoided, minimized and conserved as stated above.

In addition, the Service continues to maintain that establishment of a grassland parcel on the site of not less than 30.8 acres as proposed under Alternative 2 would be a desirable feature of any selected alternative including Alternative 4. Such a feature could be designed to aid in reducing hazards of wildfires destroying habitat and to improve feeding conditions for raptors which utilize the Bushy Lake site. This is especially important with Alternative 4, since expansion of Bushy Lake would diminish raptor habitat by increasing wetland area and decreasing terrestrial area.

Should alternative 4 move forward into the design phase, a more thorough analysis by the Service, both qualitative and using HEP, with be necessary.

LITERATURE CITED

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